ORIGINAL ARTICLE

The State of Cooperative Learning in Postsecondary and Professional Settings

David W. Johnson · Roger T. Johnson · Karl Smith

Abstract Modern cooperative learning began in the mid- 1960s (D. W. Johnson & R. Johnson, 1999a). Its use, however, was resisted by advocates of social Darwinism (who believed that students must be taught to survive in a "dog-eat-dog" world) and individualism (who believed in the myth of the "rugged individualist"). Despite the resistance, cooperative learning is now an accepted, and often the preferred, instructional procedures at all levels of education. Cooperative learning is being used in postsecondary education in every part of the world. It is difficult to find a text on instructional methods, a journal on teaching, or instructional guidelines that do not discuss cooperative learning. Materials on cooperative learning have been translated into dozens of languages. Cooperative learning is one of the success stories of both psychology and education. One of the most distinctive characteristics of cooperative learning, and perhaps the reason for its success, is the close relationship between theory, research, and practice. In this article, social interdependence theory will be reviewed, the research validating the theory will be summarized, and the five basic elements needed to understand the dynamics of cooperation and operationalize the validated theory will be discussed. Finally the controversies in the research and the remaining questions that need to be answered by future research will be noted.

Keywords Cooperative learning · Collaborative learning · Peer learning · College · University · Postsecondary · Professional school · Active learning

A number of reports conclude that higher education is "declining by degrees" and is "underachieving" (Hersh & Merrow, 2005; Bok, 2005). While the conclusion seems to be that postsecondary education is not performing well, there is a lack of focus on how to

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improve it. Sullivan (2005), in his overview of professionalism in America, highlights the problems associated with competition (i.e., negative interdependence) and advocates the cooperation inherent in "civic professionalism." He proposes that professional education may be renewed through three apprenticeships, an apprenticeship of the head that focuses on intellectual or cognitive development, an apprenticeship of the hand that focuses on the tacit knowledge and skills practiced by competent practitioners, and an apprenticeship of the heart that focuses on the attitudes and values shared by the professional community. Thus, it is not only more academic focus that is needed, but also practical skills and civic values.

An instructional procedure that affects the head and hand while simultaneously affecting the heart, thereby potentially reversing the negative trends noted in higher education, is cooperative learning. Modern cooperative learning began in the mid-1960s (D. W. Johnson & R. Johnson, 1999a). Its use, however, was resisted by advocates of social Darwinism (who believed that students must be taught to survive in a "dog-eat-dog" world) and individualism (who believed in the myth of the "rugged individualist"). Despite the resistance, cooperative learning is now an accepted, and often the preferred, instructional procedure at all levels of education. Cooperative learning is being used in postsecondary education in every part of the world. It is difficult to find a text on instructional methods, a journal on teaching, or instructional guidelines that do not discuss cooperative learning. Materials on cooperative learning have been translated into dozens of languages. Cooperative learning is one of the success stories of both psychology and education.

One of the most distinctive characteristics of cooperative learning, and perhaps the reason for its success, is the close relationship between theory, research, and practice. In this article, social interdependence theory will be reviewed, the research validating the theory will be summarized, and the five basic elements needed to understand the dynamics of cooperation and operationalize the validated theory will be discussed. Finally the controversies in the research and the remaining questions that need to be answered by future research will be noted.

Social Interdependence Theory

In the early 1900s, one of the founders of Gestalt Psychology, Kurt Kufka, proposed that groups were dynamic wholes in which interdependence among members could vary. One of his colleagues, Kurt Lewin (1935, 1948), refined Kofka's notion in the 1930s and 1940s and proposed that (a) the essence of a group is the interdependence among members (created by common goals) that results in the group being a "dynamic whole" so that a change in the state of any member or subgroup changes the state of all other members or subgroups and (b) an intrinsic state of tension in group members motivates movement toward the accomplishment of the desired common goals. One of Lewin's graduate students, Morton Deutsch (1949, 1962) extended Lewin's notions to the relationship among the goals of two or more individuals. In doing so, he developed social interdependence theory. One of Deutsch's graduate students, David W. Johnson (collaborating with Roger Johnson and colleagues such as Karl Smith), extended social interdependence theory and developed procedures for instructors.

Social interdependence exists when the accomplishment of each individual's goals is affected by the actions of others (Deutsch, 1949, 1962; Johnson, 1970; D. W. Johnson & R. Johnson, 1989). There are two types of social interdependence, positive (cooperation) and negative (competition). *Positive interdependence* exists when individuals perceive that they can reach their goals if and only if the other individuals with whom they are cooperatively linked also reach their goals and, therefore, promote each other's efforts to achieve the

goals. *Negative interdependence* exists when individuals perceive that they can obtain their goals if and only if the other individuals with whom they are competitively linked fail to obtain their goals and, therefore, obstruct each other's efforts to achieve the goals. *No interdependence* results in a situation in which individuals perceive that they can reach their goal regardless of whether other individuals in the situation attain or do not attain their goals. Each type of interdependence results in certain psychological processes.
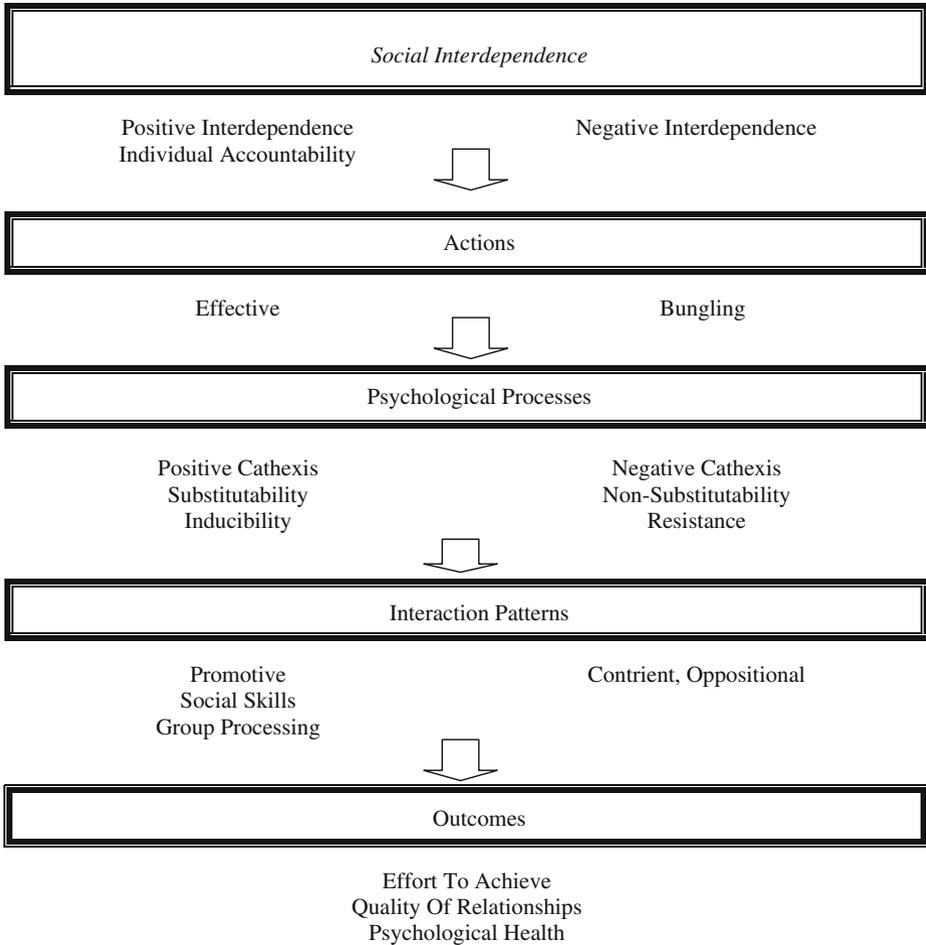
Psychological processes

The psychological processes created by positive interdependence include *substitutability* (i.e., the degree to which actions of one person substitute for the actions of another person), *inducibility* (i.e., openness to being influenced and to influencing others), and *positive cathexis* (i.e., investment of positive psychological energy in objects outside of oneself) (Deutsch, 1949, 1962). These processes explain how self-interest is expanded to joint interest and how new goals and motives are created in cooperative and competitive situations. Self-interest becomes expanded to mutual interest through other people's actions substituting for one's own, through an emotional investment in achieving goals (that benefit others as well as oneself and generalizes to caring and committed relationships with those who are working for the same purposes and goals), and through an openness to being influenced so that joint efforts are more effective. Demonstrating the transition from self-interest to mutual interest is perhaps one of the most important aspects of social interdependence theory.

Negative interdependence creates the psychological processes of *non-substitutability* (i.e., the actions of one person do not substitute for the actions of another person), resistance to being influenced by others, and negative cathexis. Thus, self-interest is strengthened and the motives to win and avoid losing are strengthened.

No interdependence detaches a person from others, thereby creating non-substitutability, no inducibility or resistance, and cathexis only to one's own actions. Thus, self-interest and the motive to succeed are maintained.

Interaction patterns

The basic premise of social interdependence theory is that the way in which interdependence is structured determines how individuals interact and the interaction pattern determines the outcomes of the situation (Deutsch, 1949, 1962; Johnson, 1970; D. W. Johnson & R. Johnson, 1974, 1989, 2006b) (see Fig. 1). Positive interdependence results in promotive interaction, negative interdependence results in oppositional or contrient interaction, and no interdependence results in the absence of interaction. *Promotive interaction* may be defined as individuals encouraging and facilitating each other's efforts to complete tasks, achieve, or produce in order to reach the group's goals. It consists of a number of variables, including mutual help and assistance, exchange of needed resources, effective communication, mutual influence, trust, and constructive management of conflict. *Oppositional interaction* may be defined as individuals discouraging and obstructing each other's efforts to complete tasks, achieve, or produce in order to reach their goals; individuals focus both on increasing their own productivity and on preventing any other person from producing more than they do. It consists of such variables as obstruction of each other's goal achievement efforts, tactics of threat and coercion, ineffective and misleading communication, distrust, and striving to win in conflicts. *No interaction* may be defined as individuals acting independently without any interchange with each other while they work to achieve their goals; individuals focus only on increasing their own productivity and achievement and ignore as irrelevant the efforts of others.

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┌─────────────────────────────────────────────────────────────────┐
│                      Social Interdependence                       │
└─────────────────────────────────────────────────────────────────┘

    Positive Interdependence              Negative Interdependence
    Individual Accountability        ⬇

┌─────────────────────────────────────────────────────────────────┐
│                            Actions                                │
└─────────────────────────────────────────────────────────────────┘

            Effective                         Bungling
                                 ⬇

┌─────────────────────────────────────────────────────────────────┐
│                     Psychological Processes                       │
└─────────────────────────────────────────────────────────────────┘

       Positive Cathexis                  Negative Cathexis
        Substitutability                 Non-Substitutability
          Inducibility                       Resistance
                                 ⬇

┌─────────────────────────────────────────────────────────────────┐
│                      Interaction Patterns                         │
└─────────────────────────────────────────────────────────────────┘

          Promotive                    Contrient, Oppositional
         Social Skills
        Group Processing
                                 ⬇

┌─────────────────────────────────────────────────────────────────┐
│                            Outcomes                               │
└─────────────────────────────────────────────────────────────────┘

                         Effort To Achieve
                      Quality Of Relationships
                        Psychological Health
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Fig. 1 Overview of social interdependence theory.

Besides having a very powerful and strategic underlying theory, cooperative learning has been the subject of hundreds and hundreds of research studies. While many of these studies confirm that positive interdependence does in fact result in promotive interaction and negative interdependence does in fact result in oppositional interaction, most of the research has focused on the outcomes of cooperative, competitive, and individualistic efforts.

Outcomes of Social Interdependence

Since the 1960s, we have been developing a comprehensive library of all the research conducted on cooperative learning. Over 305 studies have compared the relative efficacy of cooperative, competitive, and individualistic learning in college and adult settings. While the first study was conducted in 1924, 68% of the studies have been conducted since 1970. Sixty percent randomly assigned subjects to conditions, 82% were published in journals,

and 49% consisted of only one session. The results of the research comparing cooperative, competitive, and individualistic efforts may be summarized into three categories: effort to achieve, interpersonal relationships, and psychological health. In addition, there are a number of studies on attitudes toward the college experience and the socialization of students into the civic values needed to be part of a professional community of practice.

Effort to achieve

Cooperation, compared with competitive and individualistic efforts, tends to result in higher achievement, greater long-term retention of what is learned, more frequent use of higher-level reasoning (critical thinking) and meta-cognitive thought, more accurate and creative problem-solving, more willingness to take on difficult tasks and persist (despite difficulties) in working toward goal accomplishment, more intrinsic motivation, transfer of learning from one situation to another, and greater time on task (D. W. Johnson & R. Johnson, 1989). Outcomes such as these have multiple and far reaching impact on students' college experiences.

Between 1924 and 1997, over 168 studies were conducted comparing the relative efficacy of cooperative, competitive, and individualistic learning on individual achievement of participants 18 years or older. The results of these studies indicated that cooperative learning promoted higher individual achievement than did competitive (effect size=0.49) or individualistic (effect size=0.53) learning. These are significant and substantial increases in achievement. College students who would score at the 50th percentile level when learning competitively will score at the 69th percentile level when learning cooperatively. Students who would score at the 53rd percentile level when learning individualistically, will score at the 70th percentile when learning cooperatively. These results held for verbal tasks (such as reading, writing, and orally presenting), mathematical tasks, and procedural tasks (such as swimming, golf, and tennis).

These results have important implications for the findings on college effectiveness (Astin, 1993; McKeachie, Pintrich, Yi-Guang, & Smith, 1986; Tinto, 1993). Astin (1993) found that student-student interaction and student-faculty interaction were the two major influences on college effectiveness (academic development, personal development, and satisfaction with the college experience). He notes that this interaction has to be cooperative, not competitive. McKeachie *et al.* (1986) found that learning how to engage in critical thinking depends on student participation in class, teacher encouragement, and student-student interaction, all of which are found in cooperative, not competitive or individualistic, learning situations. Finally, the higher achievement resulting from cooperative efforts influences the eight causes for students leaving college before they are graduated (Tinto, 1993). The higher achievement promoted by cooperative learning may be hypothesized to decrease the number of students who are dismissed from college due to academic failure and the resulting academic success may decrease the uncertainty students may feel about the relevance of their college experience. When students achieve, increases may be expected in the quality of their intellectual membership in institution, intellectual adjustment to college, integration into academic life, commitment to completing college, and perception of the relevance of the curricula to their needs. Finally, higher achievement may mean greater eligibility for financial aid which may reduce the financial cost of college.

Positive relationships and social support

Many of the important outcomes of college depend on the quality of the relationships among students and between students and faculty (Astin, 1993). Overall, the research indicates that cooperation promotes more positive interpersonal relationships and greater social support (both academic and

personal) than do competitive or individualistic efforts, even among students from different ethnic, cultural, language, social class, ability, and gender groups   (D. W. Johnson & R. Johnson, 1989). Since the 1940s, there have been 95 studies examining the quality of relationships among individuals 18 years or older. Our meta-analysis found that cooperative efforts promoted greater liking among students than did competing with others (effect size=0.68) or working individualistically on one's own (effect size=0.55). These studies included measures of interpersonal attraction, esprit-de-corps, cohesiveness, trust, and other relationship variables. In the 24 studies that have focused on social support, furthermore, college students learning cooperatively perceived more social support (both academically and personally) from peers and instructors than did students working competitively (effect size=0.60) or individualistically (effect size=0.51).

The positive interpersonal relationships promoted by cooperative learning are the heart of the learning community. They may increase the quality of social adjustment to college life, add social goals for continued attendance, reduce uncertainty about attending college, increase commitment to stay in college, increase integration into college life, reduce the incongruence between students' interests and needs and college curricula, and increase social membership in college (Tinto, 1993).

Psychological health and self-esteem

Several studies have directly measured the relationship between social interdependence and psychological health (see D. W. Johnson & R. Johnson, 1989, 1999a, 2006b). The samples studied included university students, older adults, suburban high-school seniors, juvenile and adult prisoners, step-couples, Olympic hockey players, and Chinese business executives. The results indicate that cooperative attitudes are highly correlated with a wide variety of indices of psychological health, competitiveness was in some cases positively and in some cases negatively related to psychological health, and individualistic attitudes were negatively related to a wide variety of indices of psychological health.

One important aspect of psychological health is self-esteem. The studies that have been conducted at the college level found that cooperation promoted higher self-esteem than did competitive (effect size=0.47) or individualistic (effect size=0.29) efforts. Members of cooperative groups also become more socially skilled than do students working competitively or individualistically. Not only is the level of self-esteem affected by being part of a group effort, but the process by which individuals make judgments about their self-worth is also affected. Norem-Hebeisen and Johnson (1981) conducted four studies involving 821 white, middle-class, high school seniors in a Midwestern suburban community. They found that cooperative experiences promoted basic self-acceptance, freedom from conditional acceptance, and seeing oneself positively compared to peers. Competitive experiences were related to conditional self-acceptance and individualistic attitudes were related to basic self-rejection, including anxiety about relating to other people. Cooperative, group-based experiences seem to result in the (a) internalizing perceptions that one is known, accepted, and liked as one is, (b) internalizing mutual success, and (c) developing multi-dimensional views of self and others that allow for positive self-perceptions (D. W. Johnson & R. Johnson, 1989).

The psychological health promoted by cooperative learning has multiple effects on the college experience. It may increase students' academic self-concept and self-efficacy, quality of psychological adjustment to college life, ability to formulate and achieve meaningful goals including career goals, ability to deal with uncertainty, ability to commit to goals that require a college education, integration into the college community, a better understanding of one's interests and needs and the possible relevance of the college curricula, the ability to find ways that personal goals may be met within current situations, and the ability to initiate, form, and maintain meaningful interpersonal relationships (Tinto, 1993).

Positive attitudes toward the college experience

There is far more to college than academic learning. Colleges wish to inculcate numerous attitudes and behavioral patterns in students. Students need to develop a love of learning, distinguish between sense and nonsense, learn to take pride in doing high-quality work, and strive to improve continuously. Students need to develop self-respect and respect for other people. They need to learn how to fulfill reliably assigned roles. Students need to develop a meaningful purpose and direction in life, a desire to achieve, and a wish to contribute to making the world a better place. Students need to develop a love of democracy and liberty, a high level of patriotism, and a desire to be a good citizen. Students need to learn to value the diversity of people within our society. Students, furthermore, need to develop life-long health habits such as nutritious eating patterns, adequate sleep, and regular exercise.

The impact of cooperative experiences on attitude development is a neglected area of research. There is, however, evidence that cooperative learning promotes more positive attitudes toward learning, the subject area, and the college than do competitive or individualistic learning (D. W. Johnson & R. Johnson, 1989, 1999a). There are numerous social psychological theories, furthermore, that predict students' values, attitudes, and behavioral patterns are most effectively developed and changed in cooperative groups (D. W. Johnson & F. Johnson, 2006a). It is in group discussions that students learn the norms of their reference groups, publicly commit themselves to adopt the desired attitudes and behaviors, are exposed to visible and credible social models, and advocate attitudes and behaviors to others. Cooperative groups are perhaps the most effective tool colleges have in inculcating desired attitudes in students.

Civic values

Professional education requires that students adopt the civic values needed to be part of a professional community. To create the common culture that defines a community, there must be common goals and shared values that help define appropriate behavior and increase the quality of life within the community. A professional community cannot flourish when dominated by (a) competition where members value striving for their personal success at the expense of others or (b) individualistic efforts where members value only their own self-interests. Rather, members need to internalize values underlying cooperation, such as commitment to the common good and to the well being of other members, a sense of responsibility to contribute one's fair share of the work, respect for the efforts of others and for them as people, behaving with integrity, caring for other members, compassion when other members are in need, and appreciation of diversity (D. W. Johnson & R. Johnson, 1996, 1999b). Such civic values both underlie and are promoted by the cooperative learning experiences in postsecondary programs. Since it is through the ebb-and-flow of daily life in the school that values are most effectively taught, most of class time should be spent working in cooperative learning groups. Involvement in competitive and individualistic learning activities promotes values that inhibit later professional behavior.

Reciprocal relationships among outcomes

The outcomes resulting from cooperative efforts tend to be reciprocally related (D. W. Johnson & R. Johnson, 1989). The more effort students expend in working together, the more they tend to like each other. The more they like each other, the harder they tend to work. The more individuals work together, the greater tends to be their social competencies, self-esteem, and

general psychological health. The healthier individuals are psychologically, the more effectively they tend to work together. The more caring and committed relationships individuals are involved in, the healthier they will tend to be psychologically; the healthier individuals are psychologically, the more able they are to form caring and committed relationships. These multiple outcomes form a gestalt that is central to creating a learning community (Fig. 2).

The research is even more impressive than it looks

The research on cooperative learning is like a diamond. The more light you focus on it, the brighter and more multi-faceted it becomes. The power of cooperative learning is clearly illuminated by the magnitude of the effect sizes, but the more you read the research and the more closely you examine the studies, the better cooperative learning looks. Here are some of the reasons.

First, cooperative learning is a very cost-effective instructional procedure. It affects many different instructional outcomes simultaneously.

Second, the research studies are a combination of theoretical and demonstration studies conducted in labs, classrooms, and colleges as a whole. While the lab studies may have lasted for only one session, some of the demonstration studies lasted for the entire semester or academic year. Demonstration studies are usually (a) summative evaluations demonstrating that cooperative learning produces beneficial results or (b) comparative summative evaluations demonstrating that one cooperative learning procedure works better than others. The combination of scientific and demonstration studies strengthens the confidence college instructors can have in the effectiveness of cooperative learning procedures.

Third, the research on cooperative learning has a validity and a generalizability rarely found in the educational literature. It has been conducted over eleven decades by numerous researchers with markedly different orientations working in different colleges and countries. Research participants have varied as to economic class, age, sex, nationality, and cultural background. The researchers have used a wide variety of tasks, subject areas, ways of structuring cooperative learning, and ways of measuring dependent variables. Vastly

Fig. 2 Outcomes of cooperative learning.
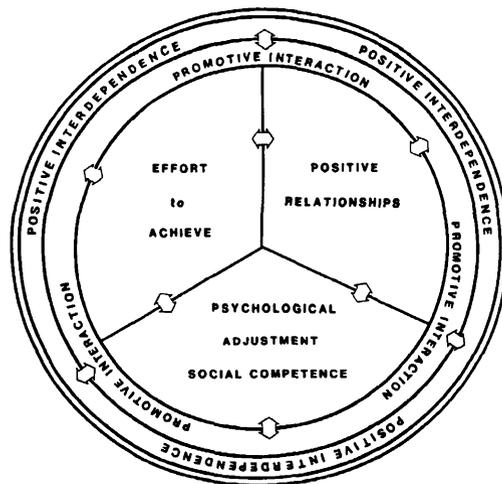
Source: Johnson, D. W., & Johnson, R. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Company. Reprinted with permission.

different methodologies have been used. The combination of the amount and diversity of the research is almost unparalleled.

The Basic Elements of Cooperation

There are seeds that lie in the desert for years, waiting. It is only under the right conditions that they will grow and flourish. When the rain comes, the temperature is right, or the seed is carried to fertile earth, then its potential is unleashed and it grows. The same is true of cooperation. Whenever two individuals interact, the potential for cooperation exists. Cooperation, however, will only develop under a certain set of conditions. These conditions, which were identified by social interdependence theory, are positive interdependence, individual accountability, promotive interaction, social skills, and group processing (D. W. Johnson & R. Johnson, 1989).

The heart of cooperative efforts is positive interdependence (D. W. Johnson & R. Johnson, 1992). Positive interdependence promotes a situation in which students work together in small groups to maximize the learning of all members, sharing their resources, providing mutual support, and celebrating their joint success. There are three categories of interdependence: outcome, means, and boundary interdependence (Johnson & Johnson, in press). When persons are in a cooperative or competitive situation, they are oriented toward a desired outcome, end state, goal, or reward. If there is no outcome interdependence (goal and reward interdependence), there is no cooperation or competition. In addition, the means through which the mutual goals or rewards are to be accomplished specify the actions required on the part of group members. Means interdependence includes resource (each member has part of the resources needed to complete the task), role (members are assigned complementary roles), and task (division of labor) interdependence (which are overlapping and not independent from each other). Finally, the boundaries existing among individuals and groups can define who is interdependent with whom. Boundary interdependence may exist based on abrupt discontinuities among individuals that segregate individuals into separate groups. The discontinuity may be created by environmental factors (different parts of the room or different rooms), similarity (all seated together or wearing the same color shirt), proximity (seated together), past history together, expectations of being grouped together, and differentiation from other competing groups. Boundary interdependence thus includes outside enemy (i.e., negative interdependence with another group), identity (which binds them together as an entity), and environmental (such as a specific work area) interdependence (which are overlapping and not independent from each other). For a learning situation to be cooperative, students must perceive that they are positively interdependent with other members of their learning group, that is, students must believe that they sink or swim together.

The second basic element is individual accountability, which exists when the performance of individual students is assessed, the results are given back to the individual and the group, and the member is held responsible by group mates for contributing his or her fair share to the group's success. Group members need to know (a) who needs more assistance, support, and encouragement in completing the assignment and (b) that they cannot "hitch-hike" on the work of others. The purpose of cooperative learning is to make each member a stronger individual in his or her right. Students learn together so that they can subsequently perform higher as individuals. Individual accountability may be structured by (a) giving an individual test to each student, (b) having each student explain what they

have learned to a classmate, or (b) observing each group and documenting the contributions of each member.

The third basic element is promotive interaction. Promotive interaction exists when individuals encourage and facilitate each other's efforts to complete tasks and achieve the group's goals. In order to promote each other's success, group members (a) help and assist each other, (b) exchange needed resources such as information and materials, (c) provide each other with feedback, (d) challenge each other's conclusions and reasoning, (e) advocate working harder to achieve the group's goals, (f) influence each other, and (g) act in trusting and trustworthy ways (D. W. Johnson & Johnson, 1989). Students also get to know each other on a personal as well as a professional level. To obtain meaningful interaction the size of groups needs to be small (2–4 members).

The fourth essential element is the appropriate use of social skills. Contributing to the success of a cooperative effort requires interpersonal and small group skills. Asking unskilled individuals to cooperate is somewhat futile. Leadership, decision-making, trust-building, communication, and conflict-management skills have to be taught just as purposefully and precisely as academic skills. Procedures and strategies for teaching students social skills may be found in Johnson (2006), D. W. Johnson and F. Johnson (2006a), and D. W. Johnson and R. Johnson (1999a).

The fifth essential element is group processing. Effective group work is influenced by whether or not groups periodically reflect on how well they are functioning and how they may improve their learning processes (D. W. Johnson & F. Johnson, 2006a). A process is an identifiable sequence of events taking place over time, and process goals refer to the sequence of events instrumental in achieving outcome goals. Instructors need to focus students on the continuous improvement of the processes they are using to learn by asking group members to (a) describe what member actions are helpful and unhelpful in achieving the group's goals and maintaining effective working relationships and (b) make decisions about what behaviors to continue or change. Group processing may result in (a) streamlining the learning process to make it simpler (reducing complexity), (b) eliminating unskilled and inappropriate actions (error-proofing the process), and (c) improving continuously students' skills in working as part of a team. Instructors need to provide the class time required for group processing and teach students how to analyze their processes effectively. Group processing ends with members celebrating their hard work and success.

Understanding how to implement the five essential elements enables instructors to (a) structure any lesson in any subject area with any set of curriculum materials cooperatively, (b) fine-tune and adapt cooperative learning to their specific circumstances, needs, and students, and (c) intervene to improve the effectiveness of any group that is malfunctioning. Instructor expertise in using cooperative learning depends on the ability to structure these five basic elements in cooperative lessons.

Trust and Constructive Conflict Resolution

During the 1950s and 1960s, Deutsch (1962, 1973) researched two aspects of the internal dynamics of cooperative groups that potentially enhanced outcomes: trust and conflict.

Trust

The sixth set of competencies needed for cooperative learning is establishing and maintaining a high level of trust. Trust includes (a) the awareness that beneficial or harmful consequences

could result from one's actions, (b) realization that others have the power to determine the consequences of one's actions, (c) the awareness that the harmful consequences are more serious than are the beneficial consequences, and (d) confidence that the others will behave in ways that ensure beneficial consequences for oneself (Deutsch, 1958, 1960, 1962). Interpersonal trust is built through placing one's consequences in the control of others and having one's confidence in the others confirmed. Interpersonal trust is destroyed through placing one's consequences in the hands of others and having one's confidence in the others disconfirmed through their behaving in ways that ensure harmful consequences for oneself. Trust tends to be developed and maintained in cooperative situations and it tends to be absent and destroyed in competitive and individualistic situations (Deutsch, 1958, 1960, 1962; Johnson, 1971, 1974; Johnson & Noonan, 1972).

Trust is composed of two sets of behaviors. Trusting behavior is the willingness to risk beneficial or harmful consequences by making oneself vulnerable to another person. Trustworthy behavior is the willingness to respond to another person's risk-taking in a way that ensures that the other person will experience beneficial consequences. In order to establish trust two or more people must be trustworthy and trusting. The greater the trust among group members, the more effective their cooperative efforts tend to be (Deutsch, 1962; Johnson, 2006; Johnson & Noonan, 1972).

Conflict

The seventh set of competencies needed for cooperative learning is resolving conflicts constructively. Conflict within cooperative groups, when managed constructively, enhances the effectiveness of cooperative efforts (Deutsch, 1973; D. W. Johnson & R. Johnson, 1989). There are two types of conflict that occur frequently and regularly within cooperative groups-constructive controversy and conflict of interests (D. W. Johnson & R. Johnson, 1995, 2005).

Constructive controversy

Constructive controversy exists when group members have different information, perceptions, opinions, reasoning processes, theories, and conclusions, and they must reach agreement (D. W. Johnson & R. Johnson, 1995). When the group is faced with a problem to be solved or a decision to be made, even if it is about how to proceed to achieve the group's goals, each alternative course of action is assigned to a subgroup. Members then (a) prepare the best case possible for their assigned position, (b) make a persuasive presentation of their position, (c) engage in an open discussion in which they continue to advocate their position, refute the other alternative courses of action, and rebut attacks on their position, (d) drop all advocacy and view the issue from all perspectives, and (e) achieve consensus as to the course of action to adopt based on the best reasoned judgments of all group members.

When controversies arise, they may be dealt with constructively or destructively, depending on how they are managed and the level of interpersonal and small group skills of the participants. When managed constructively, controversy promotes uncertainty about the correctness of one's views, an active search for more information, a reconceptualization of one's knowledge and conclusions and, consequently, greater mastery and retention of the material being discussed and a more reasoned judgment on the issue being considered. Individuals working alone in competitive and individualistic situations do not have the opportunity for such a process and, therefore, their productivity, quality of decision making, and achievement suffer (D. W. Johnson & R. Johnson, 1995, 2006b).

Compared with concurrence-seeking, debate, and individualistic efforts, controversy results in greater mastery and retention of the subject matter, higher quality problem solving, greater creativity in thinking, greater motivation to learn more about the topic, more productive exchange of expertise among group members, greater task involvement, more positive relationships among group members, more accurate perspective taking, and higher self-esteem. In addition, individuals enjoy it more (D. W. Johnson & R. Johnson, 2003). Controversies tend to be constructive when the situational context is cooperative, group members are heterogeneous, information and expertise is distributed within the group, members have the necessary conflict skills, and the canons of rational argumentation are followed.

Integrative negotiation and peer mediation

A conflict of interests occurs when the actions of one person striving to achieve his or her goal interfere with and obstruct the actions of another person striving to achieve his or her goal (D. W. Johnson & R. Johnson, 2002, 2005). Within the ongoing relationships of a group, conflicts of interests are resolved constructively when group members (a) negotiate integrative agreements and (b) mediate the conflicts among their groupmates. Group members negotiate integrative agreements by (a) describing what they want, (b) describing how they feel, (c) describing the reasons for their wants and feelings, (d) taking the perspective of the opposing member, (e) inventing several optional agreements that would maximize joint benefits, and (f) selecting the agreement that seems most effective (D. W. Johnson & R. Johnson, 2005). When group members use integrative negotiations and peer mediation, group productivity is considerably enhanced.

When group members are unable to negotiate an agreement, other group members may wish to mediate. A mediator is a neutral person who helps two or more people resolve their conflict, usually by negotiating an integrative agreement. Mediation consists of four steps (D. W. Johnson & R. Johnson, 2005): (a) ending hostilities, (b) ensuring disputants are committed to the mediation process, (c) helping disputants successfully negotiate with each other, and (d) formalizing the agreement into a contract.

A meta-analysis of the studies on teaching children and adolescents to use the integrative negotiation and peer mediation procedures has recently been completed (D. W. Johnson & R. Johnson, 2002, 2005). Individuals who received training mastered the integrative negotiation and peer mediation procedures, maintained that mastery months after the training had ended, applied the learned procedures to actual conflicts in classroom, school, and family settings, developed more positive attitudes toward conflict, and generally resolved the conflicts in their lives more constructively.

Most Important Controversies

In the 1960s, the major controversy was whether competitive efforts would produce higher achievement than cooperation. In the 1970s, the major controversy was whether individualistic learning would produce higher achievement than would cooperation. Both of those controversies have been resolved by the research. One controversy today is the gap between effective implementation of cooperative learning and causal implementation. Many instructors think they are using cooperative learning when in fact they are simply seating students together. They tend to have a very limited understanding of how to structure

cooperative learning effectively and, therefore, they tend to resist training, believing it is unnecessary. They need considerably more sophistication about the ways in which the five basic elements are structured into lessons.

Another problem is the power of the status quo. Lecturing has dominated postsecondary education for centuries. Using competitive evaluation practices, such as grading on the normal curve has dominated postsecondary classes for the past 70 years. Despite the considerable research indicating that these practices should change, the status quo continues.

Remaining Questions

There are numerous remaining questions to be answered by future research studies. While theoretically, cooperative experiences are viewed as the key to promote higher level moral reasoning and overall moral development (Kohlberg, 1969), there is very little actual research demonstrating this to be the case. There are very few longitudinal studies showing the long-term advantages of participating in cooperative learning later in career, family, and leisure settings. Considerable more research is needed on the basic elements that make cooperation work. More needs to be understood about the conditions under which competitive and individualistic efforts are effective. While studies on cooperative learning have now been conducted in numerous different countries, still more cross-cultural validation of social interdependence theory needs to be investigated. Finally, the impact of variables such as interpersonal attraction, social support, and self-esteem on achievement and productivity in cooperative situations needs to be better understood.

Conclusions and Summary

Like seeds in a desert, cooperation waits in every college classroom for the right conditions to occur so it can bloom and flourish. Doing so will have many benefits for the students, the faculty, and the college as a whole.

Social interdependence theory provides a rich theoretical base for cooperative learning. The theoretical base allows cooperative learning to be refined and continuously improved. It also provides the basis for identifying and understanding the internal dynamics that make cooperative learning work. Faculty structure lessons so that students are positively interdependent, individually accountable to do their fair share of the work, promote each other's success, appropriately use social skills, and periodically process how they can improve the effectiveness of their efforts. Understanding these basic elements allows precise methods of structuring cooperation to be engineered and gives faculty a set of tools for intervening in ineffective learning groups.

There is considerable research validating social interdependence theory and demonstrating that cooperative learning will work in college classes. Over 305 research studies have been conducted on cooperation at the college and adult levels. Cooperative learning is the instructional procedure of choice to maximize student learning (especially of highly complex or difficult material) and long-term retention. In addition, cooperative learning is a central procedure for creating positive interpersonal relationships and personal and academic support promoting greater psychological health and well-being (including self-esteem and social competencies), and developing positive attitudes toward the postsecondary experience, and inculcating civic values.

The use of cooperative learning groups creates certain opportunities that do not exist when students work competitively or individually. In cooperative groups students can engage in discussions in which they construct and extend conceptual understanding of what is being learned and develop shared mental models. Groupmates can hold students accountable to learn, provide feedback on how well they are doing, and give support and encouragement for further attempts to learn. Students can observe the most outstanding group members as behavioral models to be emulated. It is through discussions in small groups that students acquire attitudes and values (such as the need for continuous improvement). Finally, it is within cooperative groups that students establish a shared identity as members of the college. These, and many other opportunities, are lacking when students learn competitively or individualistically. As Kurt Lewin often stated, "*I always found myself unable to think as a single person.*" The same is true for most students.

At the end of the musical, The Student Prince, the young king and his prime minister reminisce about the king's student days at Heidelberg University. College life is described in a song as "golden days" that are valued "all else above." What the song so aptly captures is that the college experience is recorded and held in the heart as well as the head. For students to hold their college experience in their hearts and remember it as one of the most meaningful periods of their lives, students must (a) be faced with intellectual challenges and succeed, (b) be involved in caring and supportive relationships that develop into life-long friendships, and (c) develop the habits of the heart and mind that lead to the competencies they need to relate appropriately to others and cope successfully with the adversity and stress they may face in the future. The road to these outcomes lies through cooperative learning.

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